

36  
CLAIMS

**WE CLAIM:**

- 1 A combination of a laminate and a substrate comprising:  
  
a substrate; and  
  
a laminate joined to said substrate at a seam, the laminate having a first layer (5) comprising a waterproof functional layer (10, 20), and a second layer (30) laminated to said first layer (5) and comprising a bi-component yarn having a first component and a second component, the first component being stable to a first temperature and the second component melting at a second temperature, wherein the first temperature is higher than the second temperature.
2. The combination of claim 1, whereby the seam withstands a water entry pressure of at least 0.07 bar.
3. The combination of claim 1, whereby the seam withstands a water entry pressure of at least 0.13 bar.
4. The combination of claim 1, whereby the stiffness of the seam is less than  $50 \text{ mm}^{-1}$ .
5. The combination of claim 1, whereby the shrinkage of the seam is less than 7%.
6. The combination of claim 1, whereby the seam has a width less than 0.25 cm.
7. The combination of claim 1, whereby the seam has an elongation strain at break of greater than 75%.

8. The combination of claim 1, whereby the seam has a transverse seam strength of greater than 3 pli.
9. The combination of claim 1, whereby the second layer (30) further includes a propellant which is activatable by activation means.
10. The combination of claim 1, whereby the second component is meltable at a temperature in the range from 80°C to 170°C.
11. The combination of claim 1, whereby the first component is stable to a temperature of at least 140°C.
12. The combination of claim 1, whereby the difference in temperature between the first temperature and the second temperature is at least 20°C.
13. The combination of claim 1, wherein the second layer (30) is a knitted, woven or non-woven layer.
14. The combination of claim 1, wherein the first component is selected from the group of polymers comprising polyolefins including polypropylene and polyethylene, polyester, co-polyester, polyamide, co-polyamide, cellulose or protein fibers including wool and silk.
15. The combination of claim 1, wherein the second component is selected from the group of thermoplastics comprising co-polyester, polyamide, co-polyamide or polyolefin including polyethylene and polypropylene.
16. The combination of claim 1, wherein the yarn has a cover-core structure, wherein the second component forms the cover.
17. The combination of claim 1, wherein the yarn has a "side-by-side" structure.
18. The combination of claim 1, wherein the yarn is a blend of yarns.

19. The combination of claim 13, wherein the yarn is comprised of a multiplicity of two different component strands.
20. The combination of claim 9, wherein the propellant is activated at a third temperature, the third temperature being intermediate between the second temperature and the first temperature.
21. The combination of claim 9, wherein the propellant is an integral part of the second component.
22. The combination of claim 9, wherein the propellant is selected from the group of propellants consisting of azodicarbonamide, ammonium hydrogen carbonate, toluolsulfohydrazin or diazoaminobenzol.
23. The combination of claim 22, wherein the propellant is azodicarbonamide.
24. The combination of claim 1, wherein the functional layer (5) is a membrane or a film.
25. The combination of claim 24, wherein the functional layer (5) is selected from the group of materials consisting of polyesters, polyamide, polyolefins, polyvinylchloride, polyketones, polysulfones, polycarbonates, fluoropolymers including polytetrafluoroethylene (PTFE), polyacrylates, polyurethanes, co-polyetheresters, co-polyetheramides.
26. The combination of claim 25, wherein the functional layer (5) is made from expanded PTFE.
27. The combination of claim 1, wherein the laminate has an RET less than 150.
28. The combination of claim 1, wherein the water entry pressure of the

29. Article of clothing made from the combination of claim 1.
30. A combination of two laminates joined together at a seam, each of the laminate comprises:
- a first layer (5) comprising a waterproof functional layer (10, 20), and
- a second layer (30) laminated to said first layer (5) and comprising a bi-component yarn having a first component and a second component, the first component being stable to a first temperature and the second component melting at a second temperature, wherein the first temperature is higher than the second temperature.
31. The combination of claim 30, whereby, the seam withstands a water entry pressure of at least 0.07 bar.
32. The combination of claim 30, whereby the seam withstands a water entry pressure of at least 0.13 bar.
33. The combination of claim 30, whereby the seam has a width less than 0.25 cm.
34. The combination of claim 30, whereby the seam has an elongation strain at break of greater than 75%.
35. The combination of claim 30, whereby the seam has a transverse seam strength of greater than 3 pli.
36. The combination of claim 30, whereby the stiffness of the seam is less than  $50 \text{ mm}^{-1}$ .

37. The combination of claim 30, whereby the shrinkage of the seam is less than 7%.
38. The combination of claim 30, whereby the second layer further includes a propellant which is activatable by activation means.
39. The combination of claim 30, whereby the second component is meltable at a temperature in the range from 80°C to 170°C.
40. The combination of claim 30, whereby the first component is stable to a temperature of at least 140°C.
41. The combination of claim 30, whereby the difference in temperature between the first temperature and the second temperature is at least 20°C.
42. The combination of claim 30, wherein the first component is polyamide 6.6.
43. The combination of claim 30, wherein the second component is a thermoplastic.
44. The combination of claim 43, wherein the second component is selected from the group of thermoplastics comprising co-polyester, polyamide, co-polyamide or polyolefin including polyethylene and polypropylene.
45. The combination of claim 44, wherein the second component is a polyethylene.
46. The combination of claim 30, wherein the yarn has a sheath-core structure, wherein the second component forms the cover.
47. The combination of claim 30, wherein the yarn has a "side-by-side" structure.

48. The combination of claim 30, wherein the yarn is comprised of a multiplicity of two different component strands of yarns.
49. The combination of claim 38, wherein the propellant is activated at a third temperature, the third temperature being intermediate between the second temperature and the first temperature.
50. The combination of claim 49, wherein the propellant is an integral part of the second component.
51. The combination of claim 49, wherein the propellant is selected from the group of propellants consisting of azodicarbonamide, ammonium hydrogen carbonate, toluolsulfohydrazin or diazoaminobenzol.
52. The combination of claim 49, wherein the propellant is azodicarbonamide.
53. The combination of claim 30, wherein the functional layer (5) is a membrane or a film.
54. The combination of claim 30, wherein the functional layer (5) is selected from the group of materials consisting of polyesters, polyamide, polyolefins, polyvinylchloride, polyketones, polysulfones, polycarbonates, fluoropolymers including polytetrafluoroethylene, polyacrylates, polyurethanes, co-polyetheresters, co-polyetheramides.
55. The combination of claim 30, wherein the functional layer (5) is made from expanded PTFE.
56. A combination of two waterproof laminates, each having a functional layer (10, 20) laminated to a textile layer (30), and being joined together at a welded seam, wherein the seam has a transverse seam strength of greater than 3 pli and an elongation strain at break greater than 75%.

57. The combination of claim 56, wherein the seam has a width of less than 0.25 cm.
58. The combination of claim 56, wherein the stiffness of the seam is less than  $50 \text{ mm}^{-1}$ .
59. The combination of claim 56, wherein the seam withstands water pressure of 0.13 bar for at least three minutes.
60. The combination of claim 56, wherein the seam shrinks by less than 7% after welding.
61. A combination of two waterproof laminates, each having a functional layer (10, 20) laminated to a textile layer (30), and being joined together at a welded seam, wherein the seam has a transverse seam strength of greater than 3 pli and wherein the stiffness of the seam is less than  $50 \text{ mm}^{-1}$ .
62. The combination of claim 61, wherein the seam has a width of less than 0.25 cm.
63. The combination of claim 61, wherein elongation strain at break is greater than 75%.
64. The combination of claim 61, wherein the seam withstands a water pressure of 0.13 bar for at least three minutes